

What is claimed is:

1. A method for identifying candidate compounds for regulating skeletal muscle mass or function, comprising:

- (a) contacting a test compound with a VPAC receptor; and
- (b) determining whether the test compound binds to the VPAC receptor, wherein test compounds that bind to the VPAC receptor are identified as candidate compounds for regulating skeletal muscle mass or function.

2. A method for identifying candidate therapeutic compounds for regulating skeletal muscle mass or function, comprising:

- (a) contacting a test compound with a VPAC receptor;
- (b) determining whether the test compound binds to the VPAC receptor; and
- (c) administering a test compound determined, in step (b), to bind to the VPAC receptor, to a non-human animal, and determining whether the test compound regulates skeletal muscle mass or function in the animal, wherein test compounds that regulate skeletal muscle mass or function in the animal are identified as candidate therapeutic compounds for regulating skeletal muscle mass or function *in vivo*.

3. A method for identifying candidate compounds for regulating skeletal muscle mass or function, comprising:

- (a) contacting a test compound with a cell expressing a VPAC receptor, and
- (b) determining whether the test compound activates the VPAC receptor, wherein test compounds that activate the VPAC receptor are identified as candidate compounds for regulating skeletal muscle mass or function.

4. The method for identifying candidate compounds according to Claim 3, wherein the VPAC receptor is expressed on a eukaryotic cell and is a functional VPAC₁ receptor.

5. The method for identifying candidate compounds according to Claim 3, in which the VPAC receptor is expressed on a eukaryotic cell and is a functional VPAC₂ receptor.

6. The method for identifying candidate compounds according to Claim 3, the cell having a cellular cAMP level, in which determining whether the test compound activates the VPAC receptor involves measuring the cellular cAMP level.

7. The method for identifying candidate compounds according to Claim 6, in which the cell further comprises a reporter gene operatively associated with a cAMP responsive element and measuring the cellular cAMP level involves measuring expression of the reporter gene.

8. The method for identifying candidate compounds according to Claim 7, in which the reporter gene is alkaline phosphatase, chloramphenicol acetyltransferase, luciferase, glucuronide synthetase, growth hormone, placental alkaline phosphatase or Green Fluorescent Protein.

9. A method for identifying candidate therapeutic compounds for regulating skeletal muscle mass or function, comprising:

- (a) contacting a test compound with a cell which expresses a functional VPAC receptor;
- (b) determining whether the test compound activates the VPAC receptor; and
- (c) administering a test compound determined, in step (b), to activate the VPAC receptor, to a non-human animal, and determining whether the test compound regulates skeletal muscle mass or function in the animal, wherein test compounds that regulate skeletal muscle mass or function in the animal are identified as candidate therapeutic compounds for regulating skeletal muscle mass or function *in vivo*.

10. A method for identifying candidate therapeutic compounds from a group of one or more candidate compounds which have been previously determined to activate the VPAC receptor comprising:

administering a candidate compound to a non-human animal, and determining whether the candidate compound regulates skeletal muscle mass or function in the treated animal, wherein candidate compounds that regulate skeletal muscle mass or function in the treated animal are identified as candidate therapeutic compounds for regulating skeletal muscle mass or function *in vivo*.

11. A method for identifying candidate compounds that prolong or augment the activation of a VPAC receptor or of a VPAC receptor signal transduction pathway, comprising:

(a) contacting a test compound with a cell which expresses a functional VPAC receptor;

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(b) treating the cell with an agonist for a sufficient time and at a sufficient concentration to cause desensitization of the VPAC receptors in control cells; and

(c) determining the level of activation of the VPAC receptor, wherein test compounds that prolong or augment the activation of a VPAC receptor or of a VPAC receptor signal transduction pathway are identified as candidate compounds for regulating skeletal muscle mass or function.

12. The method for identifying candidate compounds that prolong or augment the activation of VPAC receptors according to Claim 11 wherein step (b) is preformed before or concurrently with step (a).

13. A method for identifying candidate compounds for increasing VPAC receptor expression, comprising:

(a) contacting a test compound with a cell or cell lysate containing a reporter gene operatively associated with a VPAC receptor regulatory element; and

(b) detecting expression of the reporter gene wherein test compounds that increase expression of the reporter gene are identified as candidate compounds for regulating skeletal muscle mass or function.

14. A method for identifying candidate compounds for increasing the expression of VIP or a VIP analog, comprising:

(a) contacting a test compound with a cell or cell lysate containing a reporter gene operatively associated with a VIP analog regulatory element; and

(b) detecting expression of the reporter gene wherein the test compounds that increase expression of the reporter gene are identified as compounds for regulating skeletal muscle mass or function.

15. A pharmaceutical composition, comprising:

(a) a safe and effective amount of a VPAC receptor agonist; and

(b) a pharmaceutically-acceptable carrier.

16. A method for increasing skeletal muscle mass or function in a subject in which such an increase is desirable, comprising:

(a) identifying a subject in which an increase in muscle mass or function is desirable; and

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- (b) administering to the subject a safe and effective amount of compound selected from the group consisting of a VPAC receptor agonist, a compound that prolongs or augments the activation of VPAC receptors or the activation of a VPAC receptor signal transduction pathway, an expression vector encoding a functional VPAC receptor, an expression vector encoding a constitutively active VPAC receptor, a compound that increases expression of VPAC receptors, a compound that increases expression of VIP and a compound that increases expression of a VIP analog.

17. The method for increasing skeletal muscle mass or function according to Claim 16 wherein the compound is a VPAC receptor agonist and the VPAC receptor agonist is VIP, PACAP-27, PACAP-38, helodermin, peptide histidine isoleucine amide, peptide histidine methionine amide, peptide histidine valine amide, growth hormone releasing hormone, secretin, glucagon, (Arg15, Arg21) VIP, [Arg15,20,21Leu17]-VIP-Gly-Lys-Arg-NH₂, [K¹⁵, R¹⁶, L²⁷, VIP(1-7), GRF(8-27)-NH₂], multimeric VIP fusion protein, Ro 25-1553, Ro 25-1392 or PACAP(6-38).

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18. A method for treating skeletal muscle atrophy in a subject in need of such treatment, comprising:

- (a) identifying a subject in need of treatment for skeletal muscle atrophy; and
- (b) administering to the subject a safe and effective amount of compound selected from the group consisting of a VPAC receptor agonist, a compound that prolongs or augments the activation of VPAC receptors or the activation of a VPAC receptor signal transduction pathway, an expression vector encoding a functional VPAC receptor, an expression vector encoding a constitutively active VPAC receptor, a compound that increases expression of VPAC receptors, a compound that increases expression of VIP and a compound that increases expression of a VIP analog.

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19. A method for treating skeletal muscle atrophy according to Claim 18, wherein the compound is a VPAC receptor agonist.

20. The method for treating skeletal muscle atrophy according to Claim 19, wherein the VPAC receptor agonist is identified by a method for identifying candidate compounds for regulating skeletal muscle mass or function, comprising:

- (a) contacting a test compound with a VPAC receptor, and

(b) determining whether the test compound activates the VPAC receptor, wherein test compounds that activate the VPAC receptor are identified as candidate compounds for regulating skeletal muscle mass or function.

21. The method for treating skeletal muscle atrophy according to Claim 19, wherein the VPAC receptor agonist is a chimeric or human antibody.

22. The method for treating skeletal muscle atrophy according to Claim 19, further comprising: administering to the subject a safe and effective amount of a compound that prolongs or augments the activation of VPAC receptors or the activation of a VPAC receptor signal transduction pathway.

23. The method for treating skeletal muscle atrophy according to Claim 19, wherein the VPAC receptor agonist is VIP, PACAP-27, PACAP-38, helodermin, peptide histidine isoleucine amide, peptide histidine methionine amide, peptide histidine valine amide, growth hormone releasing hormone, secretin, glucagon, (Arg15, Arg21) VIP, [Arg15,20,21Leu17]-VIP-Gly-Lys-Arg-NH₂, [K¹⁵, R¹⁶, L²⁷,VIP(1-7), GRF(8-27)-NH₂], multimeric VIP fusion protein, Ro 25-1553, Ro 25-1392 or PACAP(6-38)..

24. A purified antibody specific for a VPAC receptor, wherein the antibody is a chimeric or human antibody.

25. The antibody of Claim 24, wherein the antibody is an agonist of a VPAC receptor

26. The antibody of Claim 24, wherein the antibody is a human antibody.

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